Environmental Health Activities in North Carolina

NCEH in Partnership with North Carolina

The National Center for Environmental Health (NCEH) is part of the Centers for Disease Control and Prevention (CDC). NCEH's work focuses on three program areas: identifying environmental hazards, measuring exposure to environmental chemicals, and preventing health effects that result from environmental hazards. NCEH has approximately 450 employees and a budget for 2004 of approximately $189 million; its mission is to promote health and quality of life by preventing or controlling diseases and deaths that result from interactions between people and their environment.

NCEH and partners in **North Carolina** collaborate on a variety of environmental health projects throughout the state. In **fiscal years 2000–2004**, NCEH awarded more than **$11.3 million** in direct funds and services to North Carolina for various projects. These projects include activities related to addressing asthma from a public health perspective, reducing farmworkers' exposures to agricultural chemicals, and preventing childhood lead poisoning. In addition, North Carolina benefits from national-level prevention and response activities conducted by NCEH or NCEH-funded partners.

Identifying Environmental Hazards

NCEH identifies, investigates, and tracks environmental hazards and their effects on people's health. Following are examples of such activities that NCEH conducted or supported in **North Carolina**.

Asthma

- **Inner-City Asthma Intervention**—NCEH funded **WakeMed** in **Raleigh** to provide asthma education and individualized asthma control plans to inner-city families. The Inner-City Asthma Intervention program was directed toward health organizations that treat low-income inner-city children. The program's objective was to create asthma patient management programs where none exist. In this program, a master's level social worker tailors the intervention to the needs of the individual children. The social worker worked closely with the children's families and helped the families address a myriad of problems related to their children's asthma. Funding began in fiscal year 2001 and ended in fiscal year 2004.

> ***In fiscal years 2000–2004, NCEH awarded more than $11.3 million in direct funds and services to North Carolina.***

- **Assessing Asthma-Related School and Work Absences**—NCEH funded the **University of North Carolina** to conduct a cohort study to measure school absences because of diagnosed asthma and undiagnosed wheezing in seven public middle schools in **Buncombe County**. The study also measured parental absence from work because of the child's asthma. The objectives of this project are to prospectively measure school absences because of diagnosed asthma or undiagnosed wheezing. The project will also evaluate demographic factors (gender, socioeconomic status, race and ethnicity, and smoking) related to these types of absences. Absences of 582 middle-school students having diagnosed asthma or undiagnosed wheezing were compared with a random sample of absences in middle-school students who did not have asthma or respiratory symptoms. Preliminary analyses indicate that the proportion of absent school days was higher in students with asthma (4.03%) and wheeze only (3.37%) compared with students with no respiratory symptoms (2.92%). Middle-school students with diagnosed asthma who smoked were almost four times more likely to have absences than nonsmoking students with asthma. The data suggests that for this age group, school absences due to asthma are fewer than previously thought. Funding began in fiscal year 2001 and ended in fiscal year 2003.

- **Addressing Asthma from a Public Health Perspective**—NCEH is funding the **North Carolina Department of Health and Human Services (NCDHHS)** to work closely with stakeholders to lead a state effort and coordinate asthma activities through the **Asthma Alliance of North Carolina** and 65 local asthma coalitions. Goals of the program are to develop a comprehensive state asthma plan, enhance asthma surveillance, and increase public awareness about the need for supportive policies and environments to reduce the burden of asthma in North Carolina. Funding began in fiscal year 2003 and continues through fiscal year 2007.

Health Studies Activities

- ***Pfiesteria piscicida*-related Illness and Harmful Algal Bloom Surveillance and Prevention Program**—NCEH funds six Atlantic coast states, including **North Carolina**, to conduct surveillance for possible *Pfiesteria piscicida*-related illnesses and to identify activities and other factors that appear to increase risk for illness from harmful algal blooms. Persons calling state health departments with concerns about symptoms they believe are related to *Pfiesteria piscicida* are interviewed by state health department staff and provided information about *Pfiesteria piscicida*. Persons fitting the case description for possible estuary-related illness are referred to a physician for medical followup. Information obtained from this surveillance system will be used to develop intervention and prevention activities to reduce the risk for *Pfiesteria piscicida*-related and other harmful algal-bloom illnesses in people exposed to estuarine waters. Funding began in fiscal year 1998 and the program is ongoing.
- **Investigation of Mosquito Control and Pesticide Exposure**—On September 18, 2003, Hurricane Isabel made landfall in **North Carolina**, resulting in flooding, widespread damage, and population displacement. Studies of the aftermaths of previous hurricanes have shown that within 5 to 7 days, mosquito populations increase 500% to 1,000%. North Carolina planned aerial ultra low-volume pesticide spraying to control the adult mosquito population. Because of concerns about the potential acute and long-term health effects of mosquito spraying, health officials in North Carolina asked for NCEH's help in monitoring pesticide exposure; CDC and NCEH provided 10 staff members to help in North Carolina.

  On September 25–30, 2003, the research team recruited 90 participants from a random sample of census blocks in **Dare County** and **Chowan County** and administered questionnaires on household and occupational exposure to pesticides. The NCEH laboratory analyzed urine samples from 150 volunteers in North Carolina and Virginia neighborhoods where spraying occurred for metabolites of organophosphorus and pyrethroid insecticides. The data indicated that no increased exposures resulted from the public health pesticide applications. A final report of the study was provided to the state health department.

Measuring Exposure to Environmental Chemicals

NCEH measures environmental chemicals in people to determine how to protect people and improve their health. Following are examples of such activities that NCEH conducted or supported in **North Carolina**.

Funding

- **Antiterrorism Funding to Increase State Chemical Laboratory Capacity**—In fiscal year 2003, CDC provided more than $970,000 to **North Carolina** to help expand chemical laboratory capacity to prepare for and respond to chemical-terrorism incidents and other chemical emergencies. This expansion will allow full participation of chemical-terrorism response laboratories in the Laboratory Response Network.
- **Biomonitoring Grants**—In fiscal years 2001 and 2002, NCEH awarded planning grants to **North Carolina** to develop an implementation plan for a state biomonitoring program. In this way, the state could make decisions about which environmental chemicals within its borders were of health concern and could make plans for measuring levels of those chemicals in the North Carolina population.

Studies

- **National Heart, Lung, and Blood Institute (NHLBI) Premier Study**—This study, which began in 1998, was a randomized, multicenter clinical trial to determine the effects of implementing recommended lifestyle interventions on blood pressure. The study was conducted at

four clinical centers, including **Duke University Medical Center** in **Durham**. In collaboration with NHLBI, NCEH measured serum samples for folate; carotenoids; and vitamins A, E, and B12 for this intervention trial. The main results showed that people with above-optimum blood pressure, including those with stage 1 hypertension, can make multiple lifestyle changes that lower their blood pressure, thus reducing their risk for cardiovascular disease.

- **Johnston County Osteoarthritis Project**—Osteoarthritis of the knees, hips, and hands is a frequent cause of disability in the United States. This study, conducted in collaboration with the **University of North Carolina Chapel Hill**, seeks to identify factors that contribute to the development of osteoarthritis, what factors may exacerbate osteoarthritis, and whether these factors vary by race. NCEH will measure blood levels of lead, mercury, selenium, and other metals that might be factors related to the development of osteoarthritis in samples from residents of **Johnston County**. Approximately 1,000–1,500 samples will be analyzed over a 2-year period. Research for this study is ongoing.
- **Casa a Campo: Pesticide Study of Farmworker Families**—This study, performed in collaboration with **Wake Forest University** in **Winston-Salem**, will document the knowledge and beliefs of farm-labor families in **North Carolina** and southern Mexico about pesticide exposure and prevention both at work and in the home. This study will also measure pesticide exposure among agricultural labor families in North Carolina and southern Mexico and identify other environmental health concerns that arise from community discussions among farm-labor families in North Carolina and southern Mexico. NCEH will measure levels of organophosphate pesticides in 580 urine samples from North Carolina adults and children. Results are expected by the end of 2004.
- **Pilot Study Evaluating Symptomatic Children for Exposure to Organophosphate Pesticides: Phase 2, Central North Carolina**—This study, performed in collaboration with the U.S. Environmental Protection Agency, measured biomarkers of exposure in symptomatic children to estimate the prevalence of unrecognized pesticide-related illness. NCEH measured urinary pesticide metabolites in children 2–4 years of age living in agricultural areas in central **North Carolina**. The results, provided to the participants in 2002, showed that children had significant, yet variable, exposures to organophosphorus pesticides.
- **La Familia! Study: Reducing Farmworkers' Exposure to Agricultural Chemicals**—Performed in collaboration with **Wake Forest University** in 1999, this study sought to determine the extent of pesticide exposure among migrant farmers, as well as ways to reduce their exposure to pesticides. Samples, obtained from 75 migrant workers (mostly Hispanic men) working on tobacco farms in **North Carolina** and their families, were analyzed for pesticide metabolites. Study data indicated that most farmworkers and their families knew very little about ways to reduce their exposure to pesticides. Consequently, children in these families had pesticide levels commensurate with the farmworkers' exposure. The study provided detailed educational information to help the farmworkers reduce exposure to pesticides in their families.
- **Green Tobacco Sickness (GTS) Study**—GTS is acute nicotine poisoning that may result when the skin comes in contact with moist, mature tobacco plants. NCEH collaborated on a study of GTS with researchers from **Wake Forest University**. The purpose of the study was to better understand the nature and impact of GTS, especially its effects on minority farmworkers. Minority farmworkers are at greatest risk from this illness, but have not been studied in depth. NCEH analyzed levels of cotinine, a metabolite of nicotine, in saliva samples from affected workers. The analyses indicated that exposures varied greatly by activities, with "priming" or harvesting of tobacco associated with the greatest exposure risk. The analyses also helped identify work behaviors that might mediate the risk for exposure. Results of this study were published in the *Journal of Occupational and Environmental Health* in 2001 and in *Nicotine and Tobacco Research* in 2003.
- **Right From the Start: Early Pregnancy Health Study**—Chlorination of drinking water has benefited the public enormously by lowering the rates of infectious diseases spread through untreated water. However, disinfectants (e.g., chlorine) can react with organic matter in the

water, producing disinfection by-products (DBPs). Exposure of pregnant women to DBPs in drinking water may cause increased risk for spontaneous abortion. In collaboration with researchers at the **University of North Carolina**, NCEH is participating in a study to examine internal dose levels of four volatile DBPs in 150 women from three geographic areas in the United States (**Raleigh**; Memphis, Tennessee; and Galveston County, Texas). NCEH will measure blood levels of chloroform, bromodichloromethane, dibromochloromethane, and bromoform in study participants. Laboratory results will be reported to the study collaborators by the end of 2004.

- **The Relation Between Levels of Phthalates in Pregnant Women and Uterine Fibroids**—This pilot study, part of the Right From the Start study, looked at predictors of urinary phthalate levels in 50 pregnant women to assess whether phthalates contributed to the development of uterine fibroids. In collaboration with the **University of North Carolina, Chapel Hill**, NCEH measured concentrations of 12 phthalate metabolites in 50 urine samples collected from pregnant women between their 20th and 24th weeks of pregnancy. Study results were reported to the study collaborators in March 2004. Data analyses and interpretation of the results are ongoing.

Services

- **Helping State Public Health Laboratories Respond to Chemical Terrorism**—NCEH is working with the public health laboratory in **North Carolina** to prepare state laboratory scientists to measure chemical-terrorism agents or their metabolites in people's blood or urine. NCEH is transferring analytic methods for measuring chemical-terrorism agents (including cyanide-based compounds and other chemicals) to North Carolina. In addition, NCEH instituted a proficiency-testing program to measure the comparability of the state's analytic results with results from the NCEH laboratory.
- **Newborn Screening Quality Assurance Program**—NCEH provides proficiency-testing services and dried-blood-spot, quality-control materials to monitor and help assure the quality of screening program operations for newborns in **North Carolina**. The importance of accurate screening tests for genetic metabolic diseases cannot be overestimated. Testing of blood spots collected from newborns is mandated by law in almost every state to promote early intervention that can prevent mental retardation, severe illness, and premature death.

Preventing Health Effects That Result from Environmental Hazards

NCEH promotes safe environmental public health practices to minimize exposure to environmental hazards and prevent adverse health effects. Following is an example of such activities that NCEH conducted or supported in **North Carolina**.

- **Childhood Lead Poisoning Prevention Program**—The **North Carolina Childhood Lead Poisoning Prevention Program** (**NC CLPPP**) has received NCEH funding since 1995. In 2001, the program screened 121,906 children for lead poisoning. The number of children under 6 years of age who had elevated blood lead levels decreased from 1,259 in 1997 to 994 in 2001. These decreases in blood lead levels are due to state program efforts funded in part by NCEH.

  NC CLPPP is using NCEH funds to build local capacity, develop and implement a childhood lead poisoning elimination plan and promote primary prevention initiatives through housing-oriented programs and education. NC CLPPP is also using NCEH funds to expand risk prioritization mapping of lead exposure using data from geographic information systems and promote enrollment in preventive maintenance program and lead-safe work practices courses.

For more information about NCEH programs, activities, and publications as well as other resources, contact the NCEH Health Line toll-free at 1-888-232-6789, e-mail NCEHinfo@cdc.gov, or visit the NCEH Web site at www.cdc.gov/nceh.